FOOD OF JUVENILE *GARRA MULLYA* (SYKES)* (FAMILY CYPRINIDAE)[1]

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(With two text-figures)

The study on food of juvenile *Garra mullya* (Sykes) includes observations made on 146 juveniles collected from Kham river near Aurangabad.

Percentage composition of main food items of juveniles did not show marked seasonal differences. Variations in the percentage composition of different food items were noticed in relation to growth of juveniles. Study on the percentage of prevalence indicated that the juveniles preferred diatoms, algae and higher plants as their food. Juveniles of *G. mullya* were found to be herbivorous bottom feeders.

INTRODUCTION

Many fishes are known to change their food and feeding habits during their life histories and in different seasons. Information on food and feeding habits of juvenile *G. mullya* in relation to growth and seasons is not available. Therefore, an attempt was made to study variations in food and feeding habits of *G. mullya* juveniles.

MATERIAL AND METHODS

A total of 146 juvenile specimens of *G. mullya* ranging in size between 21 and 55 mm were collected from Kham river near Aurangabad. Fish were brought to the laboratory every week, their length measured and the alimentary canal was preserved in 5% formalin. The analysis of gut contents was carried out by two methods (i) Qualitative, the identification of food items and (ii) Quantitative, their percentage composition in the gut. Occurrence method described by Hynes (1950) and Pillay (1952) under the numerical methods was followed for the calculation of prevalence of various food items.

RESULTS AND DISCUSSION

(I) *Qualitative study of food*:

The food items found in the guts of juvenile *G. mullya* were:

(1) Higher plants: Pieces of leaves and roots of higher aquatic plants.

(2) Algae: Pieces of filamentous algae like *Spirogyra, Ulothrix, Zygnema, Oscillatoria* and *Cosmarium.*

(3) Diatoms: *Asterionella, Fragillaria, Synedra, Tabellaria, Navicula, Cymbella, Pinnularia* and *Nitzschia.*

(4) Debris: Decomposing organic matter mixed with mud and sand.

(II) *Quantitative study of food*:

Seasonal changes in the percentage composition of main food items taken by juvenile *G. mullya*:

Fig. 1. shows the variations in percentage of main food items in different months.

* The valid name for this fish is currently *Discognathus mullya*—EDS.

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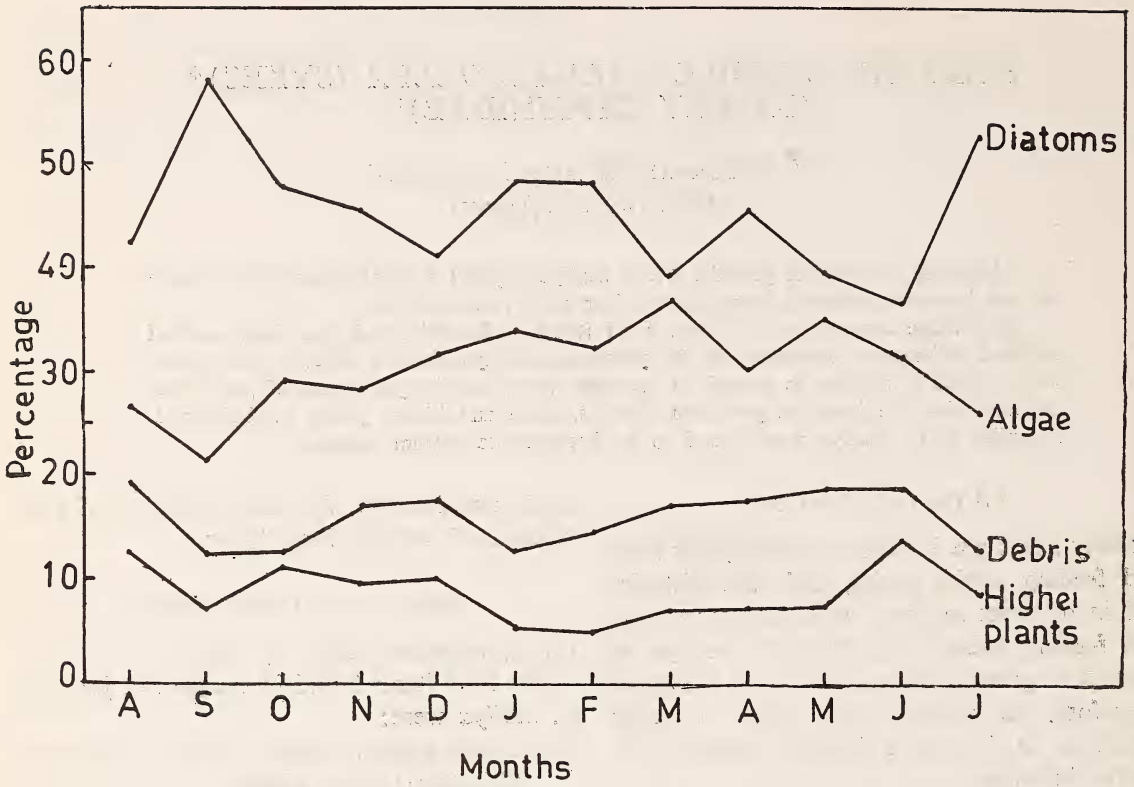

Fig. 1. Monthwise changes in the percentage composition of main food items of juvenile *G. mullya.*

Higher plants were seen in lower proportion than the other food items, fluctuating from 4.8 in February to 13.8 in June. There are comparatively low values during January to May and high values during June to December (except in September). The percentage of algae varied from 21.7 (in September) to 36.7 (in March) and is next to diatoms in predominance. Diatoms form the major food. The higher percentage of diatoms throughout the year suggests that the juveniles feed on these. The percentage of diatoms changed from 36.7 (in June) to 58.3 (in September). Along with other food items, juveniles also take in debris. The percentage of debris was found to fluctuate between 12.3 (in September) and 19.3 (in August).

Average percentage of different food items of juveniles for the year are: diatoms 45.4, algae 30.1, higher plants 8.6, and debris 15.8.

Changes in the percentage composition of main food items of juveniles in relation to growth:

The intake of food items varies during different stages of growth in fishes. The data were analysed for 5 mm length groups as shown in Fig. 2.

Higher plants were taken by all the size groups in varying percentages, their values

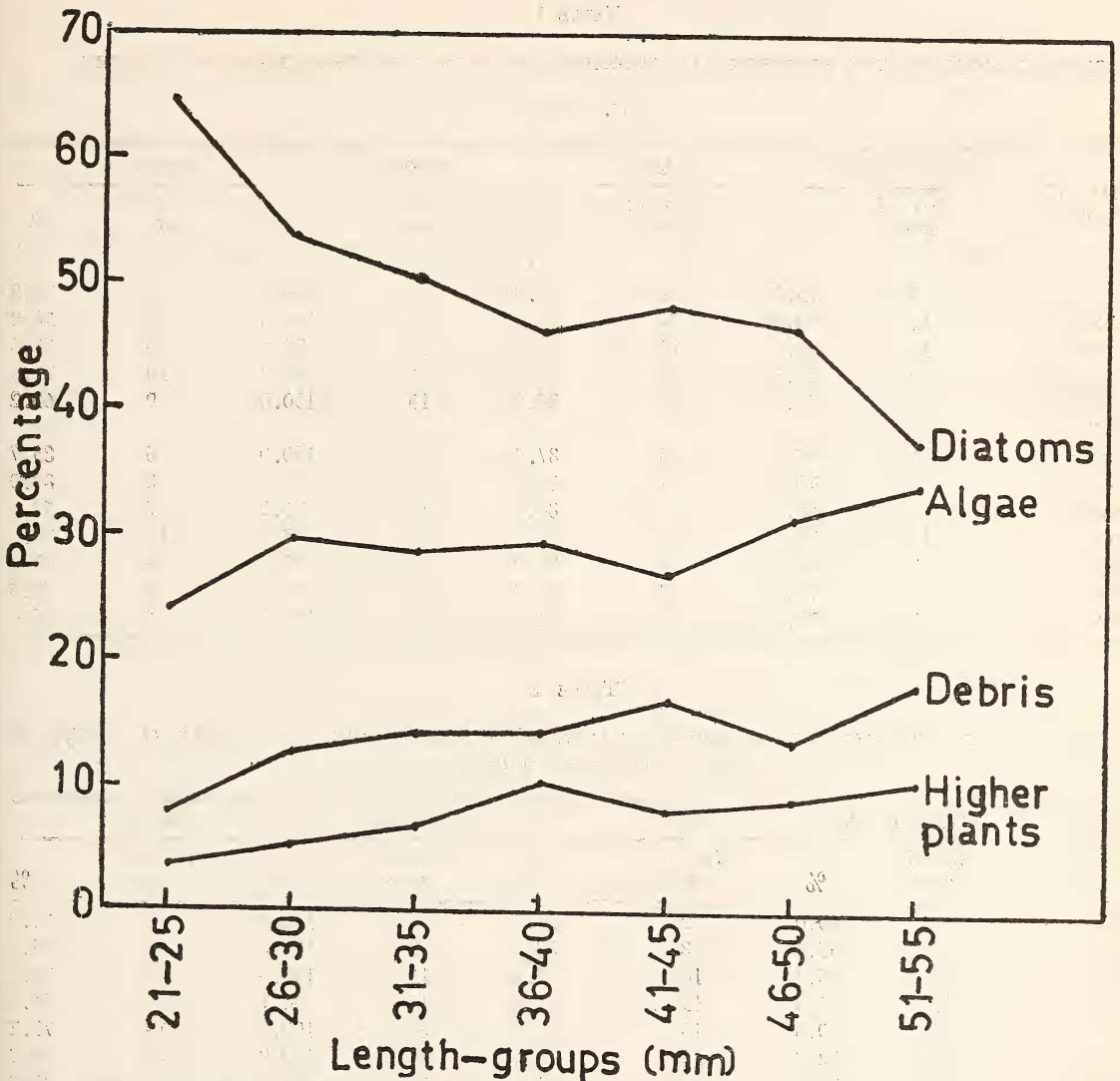

Fig. 2. Percentage composition of main food items of juvenile *G. mullya* in each 5 mm length group.

fluctuating between 3.7 (in 21-25 mm length group) and 10.6 (in 51-55 mm length group). In general the percentage of this food item increases with the increase in length. However, high percentage of higher plants (10.4) was noticed in 36-40 mm length group. Algal matter is consumed in varying percentages in all the length groups. The percentage of algae varied from 23.9 (in 21-25 mm length group) to 34.2 (in 51-55 mm length group). The intake of algae increases with the growth of juveniles, however, lower values were record-

TABLE 1

SEASONAL CHANGES IN THE PERCENTAGE OF PREVALENCE OF MAIN FOOD ITEMS TAKEN BY JUVENILE *G. mullya*

Year and Month	Higher plants		Algae		Diatoms		Debris	
	No. of guts	%	No. of guts	%	No. of guts	%	No. of guts	%
1973								
August	9	75.0	9	75.0	12	100.0	9	75.0
September	12	70.6	14	82.8	17	100.0	10	58.8
October	12	66.7	15	83.3	17	94.4	10	55.6
November	9	64.3	13	92.9	14	100.0	10	71.4
December	9	69.2	11	84.6	13	100.0	9	69.2
1974								
January	6	85.7	6	87.7	7	100.0	6	85.7
February	7	70.0	8	80.0	9	90.0	8	80.0
March	9	69.2	11	84.6	10	76.9	7	53.9
April	13	76.5	13	76.5	15	88.2	12	70.6
May	8	80.0	9	90.0	9	90.0	6	60.0
June	3	75.0	3	75.0	4	100.0	3	75.0
July	8	72.7	9	81.8	11	100.0	4	36.4

TABLE 2

CHANGES IN THE PERCENTAGE OF PREVALENCE OF MAIN FOOD ITEMS TAKEN BY JUVENILE *G. mullya* IN EACH 5 MM LENGTH GROUP

Length group (mm)	Higher plants		Algae		Diatoms		Debris	
	No. of guts	%	No. of guts	%	No. of guts	%	No. of guts	%
21-25	6	60.0	9	90.0	10	100.0	5	50.0
26-30	5	55.6	8	88.9	9	100.0	4	44.4
31-35	10	66.7	14	93.3	15	100.0	11	73.3
36-40	13	76.5	15	88.2	16	94.1	11	64.7
41-45	17	70.8	18	75.0	24	100.0	19	79.2
46-50	24	82.8	21	72.4	29	100.0	20	69.0
51-55	32	76.2	34	81.0	36	85.7	31	73.8

ed in 31-35 mm (28.6) and 41-45 mm (26.8) length groups. Diatoms form a main food item of juveniles. The percentage composition of diatoms fluctuated between 64.7 in 21-25 mm length group and 37.3 in 51-55 mm length group. As the length of the juveniles increases the percentage of diatoms decreases, showing thereby that the smaller sized juveniles feed mainly on diatoms, and as they grow algal percentage increases. Debris percentage was found to increase with the increase in the length of the juveniles. The percentage of debris was found to vary form 7.8 in 21-25 mm length group to 18.0 in 51-55 mm length group. An abrupt fall was, however, noticed in 46-50 mm length group.

(III) *Percentage of prevalence*:

Number of guts containing a particular food item either in each month or in each 5 mm length group is expressed as percentage of prevalence.

Seasonal changes:

The variations in the percentage of prevalence are shown in Table 1, which would give an idea of availability of the food items and the preference given to them by the juveniles in different months.

Higher plants were found in guts of *G. mullya* juveniles in all the months. The frequency of occurrence was found to vary from 64.3 (in November) to 85.7% (in January). Algae were consumed throughout the year. The percentage of prevalence of algae varied from 75.0 (in June and August) to 92.9 (in November). The percentage of prevalence or occurrence of diatoms is highest of all the food items taken by the juveniles. The percentage of pervalence fluctuated between 76.9 (in March) and 100.0 (in most of the months) showing thereby that most juvenile *G. mullya* consume diatoms. The average frequency of occurrence of debris was found to be lower than that of the other food items. The values varied from 36.4 (in June) to 85.7% (in January).

Changes in relation to growth:

It can be seen from Table 2 that higher plants are present in guts of juveniles in all size groups. The frequency of occurrence of this food item varied from 55.6 in 26-30 mm length group to 82.8% in 46-50 mm length group. Algae were also present in guts of individuals in all size groups. Their percentage of prevalence fluctuated between 72.4 in 46-50 mm length group and 93.3 in 31-35 mm length group. The percentage of diatoms was highest of all the other food items in all size groups. Their values ranged from 85.7 in 51-55 mm length group and 94.1 in 36-40 mm length group to 100.0% in the remaining length groups. In all the five length-groups each gut was found to contain diatoms, thereby showing the affinity of the fish for this food item. Debris was taken by the juveniles in all the length groups. The percentage of occurrence of debris was found to vary from 44.4 in 26-30 mm length group to 79.2 in 41-45 mm length group.

Thus it can be stated that as the juveniles grow from 21 to 55 mm length, the percentage of higher plants, algae and debris in their food increases whereas the percentage of diatoms decreases. It can be inferred that diatoms form a favourite food item of juveniles, and algae and higher plants come next. As the percentage of prevalence of debris is the least of all the food items and there is no consistent increase of this food item in the guts of juveniles during the rainy season when the waters are turbid with a high load of suspended silt, it can be said that it is not a food item which is favoured by the juveniles. Hence, debris must be accidentally swallowed together with the other food items.

The inferior mouth and the long alimentary canal suggest that juveniles of *G. mullya* are bottom feeders and purely herbivorous in their habit.

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REFERENCES

HYNES, H. B. N. (1950): The food of freshwater sticklebacks (*Gastrosteus pungitius*) with a review of methods used in studies of the food of fishes. *J. Anim. Ecol.*,*19*(1): 35-38.

PILLAY, T. V. R. (1952): A critique of the methods of study of food of fishes. *J. zool. Soc. India*, *4*: 185-200.